C. TECHNICAL DATA

1. Features and Benefits

Approvals	Meets CE and IEC 1010 requirements.
True RMS	Needed to accurately measure non-sinusoidal AC voltage and current waveforms found on many controls and circuits.
Auto Set	440 automatically sets-up the scope depending on the magnitude of the signal being measured.
Real Time Update	Tracks events as they happen.
Glitch Capture	Finds spikes in signals.
Relative Mode	LCD displays the difference between the measured value and a stored value.
Trend Mode	Graphs signals to find problems with circuits.
Record Mode	Records Min/Max and Average values. Time reference when value was obtained.
Compare Mode	Compares stored value with measured value for matching components.
Relative % Mode	Displays measured value as a percentage of stored value for checking component tolerances.
RS232 Output	Transfers data directly to a PC while measuring.
Back Light	Allows viewing in any light condition.
Autorange	Automatically selects best range for measurement.
Low Battery Indication	Battery should be charged when battery symbol displays on LCD.

2. Specifications

IEC 1010 Over Voltage:
CAT II - 1000V
CAT III - 600V
Pollution Degree 2

OSCILLOSCOPE FUNCTIONS

Horizontal	
Sample Rate	20 Megasamples/second
Record Length	256 in all modes(pixel).
Samples/Division	20
Update rate	Real time.
Modes	Single shot
Accuracy	±0.01%
Sweep Rate	1µS to 1S in 1,2,5 sequence

Vertical	
Bandwidth	1 MHz
Resolution	8 Bits
Channels	Single
Coupling	AC, DC
Input Impedance	1.11 M Ohm
Accuracy	±3%
Max. Input Volts	1000 Vp-p

OSCILLOSCOPE FUNCTIONS (cont.)

Triggering	
Type	Internal
Coupling	AC, DC, Glitch Capture
Slope	+ or - edge
Internal Trigger Sensitivity	2/20 Division

Other	
Glitch Capture	Over 0.05 Horizontal division, 0.25 Vertical division spike. Minimum time 1μS.
Digital Trigger Delay Time	0-512 Samples
Logic Test Display	3V & 5V CMOS, TTL

DIGITAL MULTIMETER FUNCTIONS

a. DCV

Range	Resolution	Accuracy	Impedance
400mV	0.1mV	±0.3% of reading, ±2 digits	more then 100MΩ
4V	0.001V		10MΩ
40V	0.01V		
400V	0.1V		
1000V	1V		

b1. ACV (20Hz to 50Hz)

Range	Resolution	Accuracy	Impedance
300mV	0.1mV	±1.5% of reading, ±10 digits	1.11MΩ
3V	0.001V		
30V	0.01V		
300V	0.1V		
750V	1V		

*__NOTICE__: Digit fluctuates at AC 20Hz~ 40Hz range. in 1~2 minutes after input.

b2. ACV (50Hz to 1kHz, 1kHz to 10kHz)

Range	Resolution	Accuracy	Impedance
300mV	0.1mV	±0.75% of reading, ±10 digits	1.11MΩ
3V	0.001V		
30V	0.01V		
300V	0.1V		
750V	1V	(N/A for 1kHz to 10kHz)	

b3. ACV (10kHz-30kHz, 30kHz-100kHz, 100kHz-200kHz)

Range	Resolution	10-30kHz	30-100kHz	100-200kHz	Impedance
300mV	0.1mV				
3V	0.001V	±2.5% of reading,	±4% of reading,	±10% of reading,	1.11MΩ
30V	0.01V	±30 digits	±200 digits	±300 digits	
300V	0.1V				
750V	1V	N/A	N/A	N/A	

c. DCA

Range	Resolution	Accuracy	Overload Protection
400µA	0.1µA	±0.5% of reading, ±5 digits	Fuse* (fast blow) F600V, 0.5A, 31CM
4000µA	1µA		
40mA	0.01mA		
400mA	0.1mA		
4A	0.001A	±0.75% of reading, ±5 digits	F600V, 10A, 31CM
10A	0.01A		

d. ACA

Range	Resolution	20-50Hz	50Hz-3kHz	3-10kHz	10-30kHz
300µA	0.1µA	±1.0% rdg, ±10 digits	±0.75% rdg, ±10 digits	±2.0% rdg, ±20 digits	±2.0% rdg, ±40 digits
3000µA	1µA				
30mA	0.01mA				
300mA	0.1mA				N/A
3A	0.001A			N/A	
10A	0.01A				

e. OHM (Resistance,Ω)

Range	Resolution	Accuracy	Overload Protection
400Ω	0.1Ω	±0. 3% of reading, ±10 digits	600V DC or AC Peak
4kΩ	0.001kΩ	±0.3% of reading, ±2 digits	
40kΩ	0.01kΩ		
400kΩ	0.1kΩ		
4MΩ	0.001MΩ	±1.0% of reading, ±10 digits	
30MΩ	0.01MΩ	±1.5% of reading, ±20 digits	

f. Continuity Buzzer

Test Voltage	Threshold	Over Load Protection
3V	100 digits	600 V DC or Peak AC

g. Diode Test

Test Voltage	Max Test Current	Over Load Protection
3V	Approx. 2.5mA	600 V DC or Peak AC

⚠ ***Warning:** Use only correct size, voltage and current rated fuses.
Test Leads: Use only correct type and overvoltage category rating.

i. Capacitance

Range	Resolution	Accuracy	Over Load Protection
400.0nF	100pF	±3% of reading, ±5 digits	600 V DC or Peak AC
4.0µF	0.001µF		
40.0µF	0.01µF		
400.0µF	0.1µF		

j. Frequency

Range	Resolution	Accuracy	Over Load Protection
100.00Hz	0.01Hz	±0.05% of reading, ±1 digit	600 V DC or Peak AC
1.0000kHz	0.1Hz		
10.000kHz	1Hz		
100.00kHz	10Hz		
1.0000MHz	100Hz		
2.0000MHz	100Hz		

**Sensitivity(square wave)

1Hz below	N/A
2Hz to 1kHz	1V
1kHz to 2MHz	1.5V

General Specifications

Max. Volt. between any Input and Ground	1000V
Basic DC Accuracy	0.3%
Frequency Counter Range	2 MHz
Meter AC Bandwidth	200 kHz
Waveform Display Bandwidth	1 MHz
Fuse Protection	**mA:** 0.5Amp/600VAC; **A:** 10Amp/600VAC
Display Type	Super-twist LCD, 160 x 240 pixels
Operating Temp.	0° to 50°C (32° to 122°F)
Storage Temp.	-20° to 60°C (-4° to 140°F)
Relative Humidity 0% to 80%:	(0°-35°C/32°-95°F) **0% to 70%:** (35°-55°C/95°-131°F)
Temp. Coefficient	0.1 x (Specified Accuracy) per °C for temperature <18°C to >28°C
Power Supply	Nicad Battery 7.2V, AA Cell x 8
Battery Life Time	5 Hours
Battery Charge Time	3 Hours
Safety Designed	Pollution degree 2, Overvoltage Cat. II 1000V, Cat. III 600V per IEC 1010, UL3111 and C22.2 No. 1010-1
Size (H x L x W)	52 x 220 x 100mm
Weight	1 lb. 6 oz

D. MEASUREMENT TECHNIQUES

1. Controls and Functions:

Push Buttons

F1-F5 Selects additional functions displayed across the bottom of the LCD.

D Mode Selects digital scope mode with functions displayed across the bottom of the LCD.

Hold A Freezes the analog reading on the LCD.

RGE Push once to select manual ranging, push again to return to functions.

PROG Push once to select REC, REL% and COMPARE functions. Once selected, use the EDIT button to set parameters.

T.BASE Push once to select time base, push again to return to functions.

MEM Push once to waveform and setup memory, push again to return to functions.

Turn back light on and off.

Select help text.

Rotary Switch

OFF Turns the instrument off.

$\overline{\overline{V}}$ Selects the DCV function.

$\widetilde{V}$ Selects the ACV function.

Ω•))) Selects resistance or continuity buzzer function.

Selects the diode test function.

$\widetilde{\mu A}$ Selects DC or AC microamps.

$\widetilde{mA}$ Selects DC or AC milliamps.

$\overline{\widetilde{A}}$ Selects DC or AC amps.

Hz Selects the Frequency function.

LOGIC Selects the Logic Test function.

1. Controls and Functions: (cont.)

Selects the Capacitance function.

COMP Selects the Component Test function.

OFF Turns the instrument off.

Input Jacks

A Red test lead connection for current measurements on the $\widetilde{A}$ function (AC and DC amps).

µmA Red test lead connection for current measurement on the $\widetilde{\mu A}$ and $\widetilde{mA}$ functions (AC and DC micro and milliamps).

COM Black test lead connection for all functions.

VΩ Red test lead connection for Volts, Ohms, Capacitance, Logic and Component Test functions.

RS-232C Output

DB9on top of 440 See section M on RS-232C interface.